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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/870,836	06/06/97	HAMPAPUR A	VIRAGE.007A

LM01/0309

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EXAMINER	
RAO, A	
ART UNIT	**PAPER NUMBER**
2713	

DATE MAILED: 03/09/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08/870,386	Hamapapur et al.
Examiner	**Group Art Unit**
Anand Rao	2713

☒ Responsive to communication(s) filed on *Feb 22, 2000*

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire *3* month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) *1-23* is/are pending in the applicat

Of the above, claim(s) _____ is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-23* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

Response to the entered Amendment after final

1. As per the Applicant's instructions as set forth in the entered Amendment submitted on 2/22/00 as Paper 11, claim 23 has been added.

2. The indicated favorable consideration for allowance of the amended claims 1-23 as was discussed in the interview summary of 1/18/00 (Paper 8) has been withdrawn in view of the Examiner's further consideration of the prior art associated with the case and of the IDS submitted on 2/22/00 as Paper 10. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claim 18-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Zabih et al., (hereinafter referred to as "Zabih").

Zabih discloses a computerized method (Zabih: column 16, lines 20-25) of extracting a key frame (Zabih: column 1, lines 15-45)) from a video comprising the steps of: providing a reference frame (Zabih: column 5, lines 55-56: frame 1); providing a current frame different from

the reference frame (Zabih: column 5, lines 55-56: frame 2); determining a structure difference measure between the reference and current frame based at least in part on edges identified in each of the frames (Zabih: column 6, lines 58-68; column 7, lines 1-55: "edge change fraction"); and identifying a current frame as a key frame if the structural difference measure exceeds a first measure (Zabih: column 10, lines 20-30: "peaks), as in claim 18.

Regarding claim 19, Zabih discloses setting the current frame as a reference frame if a key frame is identified (Zabih: column 7, lines 36-42), as in the claim.

Regarding claim 20, Zabih discloses repeating the steps for a new current frame until the end of the video is reached (Zabih: column 7, lines 48-50), as specified.

Regarding claim 21, Zabih discloses selecting the new current frame at a predetermined time interval after the current frame (Zabih: column 9, lines 25-30), as specified.

Regarding claims 22, Zabih discloses that the predetermined time interval is user selectable (Zabih: column 9, lines 25-30), as in the claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-17 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zabih et al., (hereinafter referred to as "Zabih") in view of the submitted Dissertation by Arun Hampapur, University of Michigan, 1995, (hereinafter referred to as "Hampapur").

Zabih discloses a computerized method (Zabih: column 16, lines 20-25) of extracting a key frame (Zabih: column 1, lines 15-45)) from a video comprising the steps of: providing a reference frame (Zabih: column 5, lines 55-56: frame 1); providing a current frame different from the reference frame (Zabih: column 5, lines 55-56: frame 2); determining a structure difference measure between the reference and current frame based at least in part on edges identified in each of the frames (Zabih: column 6, lines 58-68; column 7, lines 1-55: "edge change fraction"); and identifying a current frame as a key frame if the structural difference measure exceeds a first measure (Zabih: column 10, lines 20-30: "peaks), as in claim 1. However, Zabih fails to disclose using a chromatic difference measure, and establishing key frame identification if said chromatic difference measure exceeds a second threshold. But the reference does make known to one of ordinary skill in art that the use of chromatic scaling as an intensity difference measure for detecting scene changes and further discloses the limitations of that method when used alone (Zabih: column 3, lines 4-23; column 13, lines 1-3; column 14, lines 34-38). Hampapur discloses that in using the chromatic scaling function and method in advantageously detecting scene cuts for video editing (Hampapur: pages 97-102), and in particular detecting fades and dissolves (Hampapur: page 97, lines 11-18). Accordingly, it would have been obvious for one of ordinary

skill in the art to incorporate the Hampapur chromatic scaling teaching of the dissertation into the Zabih method in order to have dual measures, because no one method works perfectly by itself (Zabih: column 16, lines 30-45). The Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, would have all of the features of claim 1.

Zabih discloses a computerized method (Zabih: column 16, lines 20-25) of extracting a key frame (Zabih: column 1, lines 15-45)) from a video comprising the steps of: providing a reference frame (Zabih: column 5, lines 55-56: frame 1); providing a current frame different from the reference frame (Zabih: column 5, lines 55-56: frame 2); determining a second difference measure between the reference and current frame based at least in part on edges identified in each of the frames (Zabih: column 6, lines 58-68; column 7, lines 1-55: "edge change fraction"); and identifying a current frame as a key frame if the second difference measure exceeds a threshold value (Zabih: column 10, lines 20-30: "peaks), as in claim 8. However, Zabih fails to disclose using a first chromatic difference measure, and establishing key frame identification if said chromatic difference measure exceeds a first threshold. But the reference does make known to one of ordinary skill in art that the use of chromatic scaling as an intensity difference measure for detecting scene changes and further discloses the limitations of that method when used alone (Zabih: column 3, lines 4-23; column 13, lines 1-3; column 14, lines 34-38). Hampapur discloses that in using the chromatic scaling function and method in advantageously detecting scene cuts for video editing (Hampapur: pages 97-102), and in particular detecting fades and dissolves (Hampapur: page 97, lines 11-18). Accordingly, it would have been obvious for one of ordinary

skill in the art to incorporate the Hampapur chromatic scaling teaching of the dissertation into the Zabih method as a first difference measure operating in conjunction with a first threshold in order to have dual measures, because no one method works perfectly by itself (Zabih: column 16, lines 30-45). The Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, would have all of the features of claim 8.

Regarding claims 2 and 9, the Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, discloses setting the current frame as a reference frame if a key frame is identified (Zabih: column 7, lines 36-42), as in the claims.

Regarding claims 3 and 10, the Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, discloses repeating the steps for a new current frame until the end of the video is reached (Zabih: column 7, lines 48-50), as specified.

Regarding claims 4 and 11, the Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, discloses selecting the new current frame at a predetermined time interval after the current frame (Zabih: column 9, lines 25-30), as specified.

Regarding claims 5 and 12, the Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, discloses that the predetermined time interval is user selectable (Zabih: column 9, lines 25-30), as in the claims.

Regarding claims 6 and 13, the Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, discloses that both the first and second thresholds are user selectable (Zabih: column 16, lines 50-60), as in the claims.

Regarding claims 7 and 14, the Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, discloses that the second difference measure is only performed if the first difference measure exceeds the first threshold (Zabih: column 15, lines 1-20), as in the claims.

Regarding claims 15-16, the Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, discloses that the second difference measure is more computationally intensive and extracts more information that the first difference measure (Hampapur: column 15, lines 30-68), as in the claims.

Regarding claim 17, the Zabih method, now incorporating the Hampapur chromatic scaling method as outlined in the dissertation, discloses using a third difference measure (Zabih: column 16, lines 60-68; column 17, lines 1-17), as in the claim.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Liou discloses an apparatus for detecting a cut in a video. Banham discloses a method and device microprocessor for selectively compressing video frames of a motion compensated prediction-based video codec. Furthermore, while the Applicants have adhered to the "duty to disclose" during all stages of prosecution including the multiple submission of pertinent prior art, it is unclear to the Examiner why the "Production Model based Digital Video Segmentation" as it appears in the *Journal of Multimedia Tools and Applications*, 1:1-38, March 1995, by Arun

Hampapur, Ramesh Jain, and Terry Weymouth (as referenced in Zabih: column 3, lines 4-17), has been omitted from either of the IDS submissions associated with the case.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anand S. Rao whose telephone number is (703)-305-4813.

asr

March 7, 2000

ANDY RAO
PRIMARY EXAMINER

Notice of References Cited

Application No.	Applicant(s)		
08/870,386	Hamapapur et al.		
Examiner		Group Art Unit	Page 1 of 1
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U.S. PATENT DOCUMENTS

	DOCUMENT NO.	DATE	NAME	CLASS	SUBCLASS
A	5,734,735	3/1998	Coleman, Jr.	382	100
B	5,764,921	6/1998	Banham et al.	348	415
C	5,835,163	3/1998	Liou et al.	348	699
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FOREIGN PATENT DOCUMENTS

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NON-PATENT DOCUMENTS

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